

WHAT IS CLAIMED IS:

1. A method comprising:  
providing a line card having:  
a digital signal processor for manipulating  
5 data received by the line card;  
a transmit channel and a receive channel  
coupled to a combined transmit and receive channel, the  
combined transmit and receive channel for a transmitting  
and receiving communications with the line card;  
10 wherein the transmit channel comprises a first  
amplifier for amplifying a signal in the transmit signal  
and the receive channel comprises a second amplifier for  
amplifying a signal in the receive channel;  
one or more electrical components in the  
15 combined channel;  
a switch disposed in the combined channel;  
terminating the combined channel with a termination  
network, the termination network having a desired  
impedance;  
20 transmitting a test signal through at least a  
portion of the transmit channel toward the combined  
channel; and  
detecting, by the digital signal processor, any  
resulting signal in the receive channel.  
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2. The method of Claim 1, wherein the transmit  
channel and the receive channel are coupled to the  
combined channel by a hybrid.
- 30 3. The method of Claim 1, wherein the one or more  
electrical components comprises a transformer.

4. The method of Claim 1, wherein the one or more electrical components comprises a connector.

5. The method of Claim 1, wherein the desired  
5 impedance is approximately equal to a characteristic impedance of a communication line conventionally used with the line card.

6. The method of Claim 5, wherein the  
10 characteristic impedance is 100 ohms.

7. The method of Claim 1, wherein transmitting a test signal through at least a portion of the transmit channel toward the combined channel further comprises  
15 transmitting a test signal to the termination network.

8. The method of Claim 7, wherein detecting, by the digital signal processor, any resulting signal in the receive channel comprises detecting a signal reflected by  
20 the termination network.

9. The method of Claim 1, wherein detecting, by digital signal processor, any resulting signal in the receive channel comprising detecting no reflected signal  
25 from the termination network.

10. The method of Claim 1, wherein detecting, by digital signal processor, any resulting signal in the receive channel comprising detecting a signal reflected  
30 by one of the one or more components.

11. The method of Claim 1, and further comprising filtering, within the transmit channel, the transmitted signal.

5 12. The method of Claim 1, and further comprising filtering, within the receive channel, any reflected signal.

10 13. The method of Claim 1, and further comprising terminating, by the switch, any test signal in the combined channel and then again detecting, by digital signal processor, and resulting signal in the receive channel.

15 14. The method of Claim 1, and further comprising comparing the detected signal to an expected signal.

20 15. The method of Claim 1, wherein the termination network is formed on the line card.

16. The method of Claim 1, wherein the termination network is formed external to the line card.

17. A method for self-testing a portion of a line card having a transmit channel and a receive channel coupled to a combined transmit and receive channel and also having a digital signal processor for manipulating data received by the line card, the method comprising:

transmitting a test signal through at least a portion of the transmit channel toward the combined channel; and

detecting, by the digital signal processor, any resulting signal in the receive channel to determine whether any components in the transmit channel, receive channel, or combined channel are malfunctioning.

18. The method of Claim 17, and further comprising terminating the combined channel with a termination circuit having a desired impedance.

19. The method of Claim 17, and further comprising introducing a reflection in the combined channel.

20. The method of Claim 17, and further comprising comparing the detected signal to an expected detected signal.

21. The method of Claim 18, and further comprising comparing the detected signal to an expected detected signal.

22. The method of Claim 19, and further comprising comparing the detected signal to an expected detected signal.

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23. The method of Claim 20, further comprising filtering the test signal within the portion of the transmit channel.

5        24. The method of Claim 23, wherein comparing the detected signal comprises comparing the detected signal to the filtered test signal.

10       25. The method of Claim 18, wherein the impedance of the termination circuit is approximately the characteristic impedance of an input line to the line card.

15       26. The method of Claim 18, and further comprising introducing an open in the combined channel.

20       27. The method of Claim 17, and further comprising terminating the combined channel with a termination circuit having an impedance and providing a switch in the combined channel before the termination circuit.

25       28. The method of Claim 27, and further comprising selectively opening or closing the switch to test the one or more of the components.

29. The method of Claim 17, and further comprising shorting the combined channel to itself.

30. A method for self-testing a portion of a line card having a digital signal processor for manipulating data received by the line card, a transmit channel, and receive channel, and a combined transmit and receive  
5 channel coupled to the transmit and receive channels, the method comprising:

terminating the combined channel with a termination network;

transmitting a test signal through a portion of the  
10 transmit channel toward the combined channel;

selectively opening or closing a switch within the combined channel; and

detecting, by the digital signal processor, any resulting signal in the receive channel after opening or  
15 closing of the switch to determine whether any components in the transmit channel, receive channel, or combined channel are malfunctioning.

31. The method of Claim 30, wherein the receive  
20 channel comprises one or more filters and a filter bypass, and further comprising selecting, by a second switch, a path for the resulting signal through either one of the filters or the filter bypass.

25 32. The method of Claim 30, wherein the transmit channel comprises a filter and a filter bypass, and further comprising selecting, by a second switch, a path for the test signal.

30 33. The method of Claim 30, and further comprising comparing the detected signal to the test signal.



35. A system for allowing self-test of a line card comprising:

a line card comprising:

5 a transmit channel and a receive channel coupled to a combined transmit and receive channel, the combined transmit and receive channel operable to transmit and receive communications with line card;

a termination network operable to terminate the combined channel and having an impedance; and

10 a switch on the line card operable to selectively couple the termination network to the combined channel; and

a digital signal processor formed on the line card and operable to manipulate data formed on the line card,  
15 the digital signal processor coupled to the receive channel and operable to detect any reflection of a signal transmitted through the transmit channel toward the combined channel.

20 36. The system of Claim 35, wherein the transmit channel comprises a filter and an associated switch operable to bypass the filter.

25 37. The system of Claim 35, wherein the receive channel comprises one or more filters and an associated switch for selecting either one of the one or more filters or selecting bypass of the one or more filters.

30 38. The system of Claim 35, wherein the termination network has an impedance approximately equal to a characteristic impedance associated with a telephone line.



39. The system of Claim 35, wherein the combined channel comprises one or more electrical components to be tested.

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40. The system of Claim 39, wherein the one or more electrical components comprises a transformer.

41. The system of Claim 35, wherein the transmit  
10 channel and receive channel are coupled to combined  
channel by a hybrid.

FOOTNOTES

